OPERATING INSTRUCTIONS
FOR
the MARCHANT FIGURE-MATIC

MODEL ADX

A "One-Two" operation in both Multiplication and Division —with automatic carriage control

Foreword

This manual will enable a beginner to learn to operate a Marchant with ease and accuracy. Marchant operators are invited to call the Marchant Representative for additional aid, if needed, and free instruction or help in special applications for various industries and professions.

Guarantee: Every new Marchant carries a guarantee of free mechanical service for twelve months. The calculator is designed to give dependable performance throughout many years, but naturally its continuous usefulness will be prolonged by periodic oiling and inspection. Therefore, we recommend that, at the end of the guarantee period, the Marchant be placed under our maintenance service so that it will receive continual expert attention at moderate cost.

Service: Mechanical service by personnel trained under factory supervision is available at Marchant offices in all principal cities of the United States, and through Marchant distributors throughout the world.

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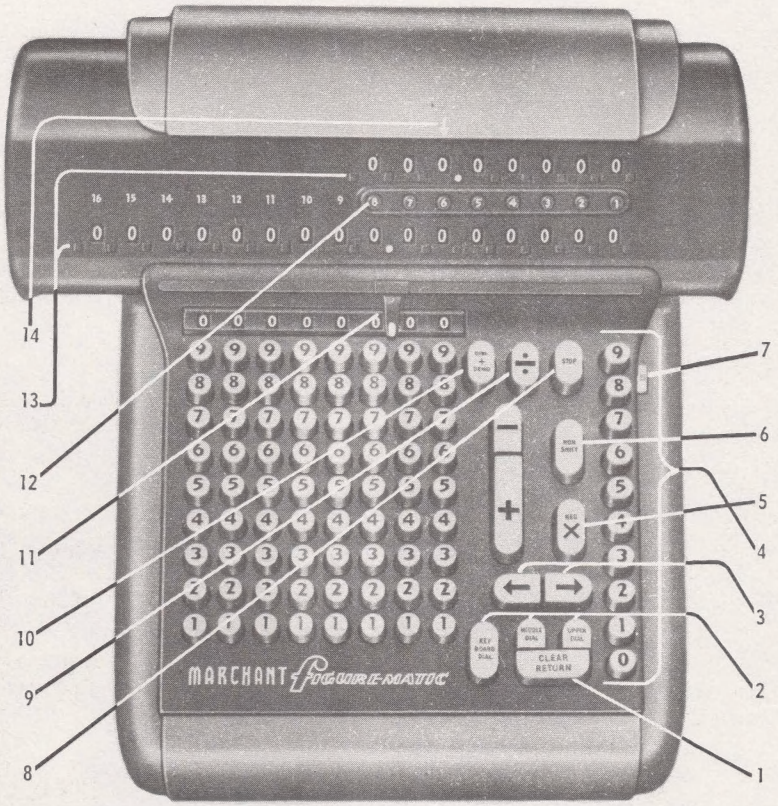
Reference Section

MARCHANT *figure-matic* CALCULATOR



MODEL ADX

1 **CLEAR-RETURN KEY**
Clears Carriage dials and simultaneously returns Carriage to Tab-Set position.

2 **ELECTRIC DIAL-CLEARANCE**
Operate together or independently.

3 **ELECTRIC CARRIAGE-SHIFT**

4 **AUTOMATIC MULTIPLIER KEYS**

5 **NEGATIVE MULTIPLICATION**

6 **NON SHIFT**
Holds Carriage stationary when Multiplier Key is touched.

7 **UPPER DIAL CONTROL**
Normal position away from operator.

8 **OPTIONAL DIVISION STOP**
Also releases Non Shift and Neg × Keys.

9 **AUTOMATIC DIVISION**

10 **DIVIDEND + KEY**
Automatically clears Carriage dials, positions Carriage, enters dividend, and clears Keyboard Dials.

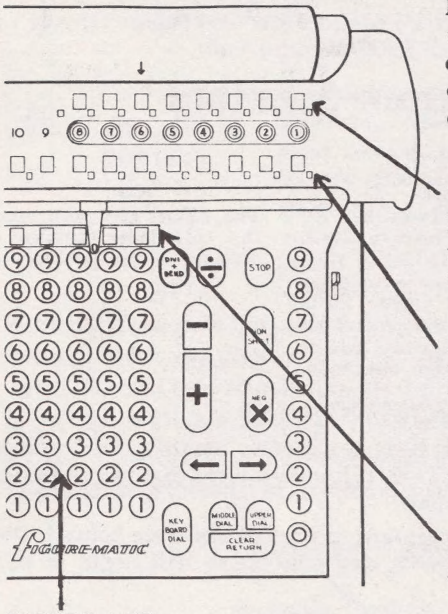
11 **KEYBOARD DIAL DECIMAL POINTER**

12 **TABULATOR**
Any one or more keys can be set at once. To release all Tab Keys, touch Tab Key "8".

13 **EASY PRE-SET DECIMALS**
White markers for each dial. Open with flip of finger.

14 **ACTIVE-DIAL INDICATOR**

Marchant has *three* dials . . .



true figure dials for all factors, including Keyboard entry. Each and every operation performed on the calculator is recorded in one or more of these three dials, which thus provide proof for every factor.

UPPER DIALS record the Multiplier in Multiplication; the Answer in Division; the Count of Items in Addition or Subtraction.

MIDDLE DIALS record the Answer in Multiplication, Addition, and Subtraction; and show the Dividend in Division (before dividing) and the Remainder in Division after dividing.

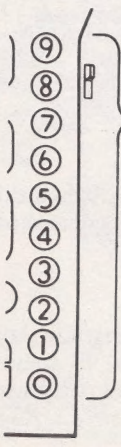
KEYBOARD DIALS show in a *straight line* every figure entered in the Keyboard.

KEYBOARD

Touch several keys in the Keyboard and notice that these figures show instantly in the Keyboard Dials, where they remain for easy checking throughout the problem.

Marchant has a positive, flexible Keyboard, which prevents the setting of more than one key in the same column at the same time.

To change any figure set in the Keyboard Dials, simply touch the desired digit. The previous figure is instantly cleared and the desired figure appears in the Keyboard Dials.



ADDITION and SUBTRACTION CONTROLS

Enter the figures in the Keyboard and check the entry in the Keyboard Dials. To add—touch the Add Bar. To subtract—touch the Subtract Bar.

AUTOMATIC MULTIPLIER KEYBOARD

Enter the Multiplier in this Automatic Multiplier Keyboard as you read the figures, from the left. For example, if the Multiplier is 7468, touch the 7, the 4, the 6 and the 8. Your Marchant will accept the figures as fast as you enter them. Proof of accuracy of this entry is in the Upper Dials.

NON-SHIFT CONTROL

Prevents the Carriage from shifting when a Multiplier Key is touched. To release, touch the control marked STOP.

NEGATIVE MULTIPLICATION

Used most frequently to subtract a Product from an amount already in the Middle Dials. To release, touch STOP Key.

AUTOMATIC DIVISION CONTROLS

A touch of the DIVIDEND + Key automatically clears Carriage dials, tabulates Carriage, enters dividend from Keyboard Dials into Middle Dials and clears Keyboard.

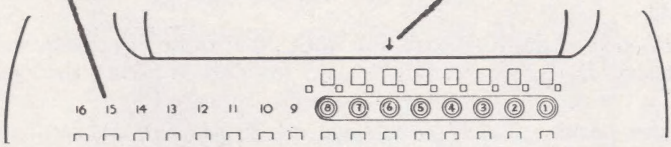
After the dividend and divisor have been entered, touch the DIVISION Key. Automatic division gives clearance of Upper Dials prior to division, and clearance of Keyboard Dials at end of division operation.

The STOP Key will stop the calculator during a division in any position.

CARRIAGE POSITIONING

The numbers on the Carriage and Tab Keys are used to identify the Carriage Position. The ACTIVE DIAL INDICATOR (Orange-colored Arrow) indicates the Carriage position, and the "active" dial.

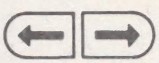
Example: When this Arrow is pointing to the 6th dial (see below), the Carriage is said to be in Position 6; any dial action will begin in this "active" dial.



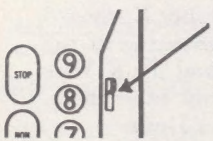
TABULATOR AND CLEAR-RETURN

Tab Keys are used in multiplication and division. Any one or more keys may be set at once. A touch of the CLEAR-RETURN Key clears the Carriage dials and returns the Carriage to the position indicated by the tab setting.

ELECTRIC CARRIAGE SHIFT



These keys electrically move the Carriage to the right or left. The Arrow indicates in which direction the *Carriage* will move. (To shift Carriage into position indicated by tab setting, hold down proper Shift Key until Carriage stops.)



UPPER DIALS CONTROL

Normal position of this control is *away* from you. When this control is *toward* the operator, the Upper Dials figures show in complementary form.

COMPLETE CARRIAGE CARRY-OVER

You know the answer is right, because Marchant's smoothly flowing Carriage mechanism makes every dial active regardless of Carriage Position. It doesn't matter *how* you operate your Marchant—no dead dials—a Marchant calculator *cannot* drop figures from dials, because every Marchant has Complete Carriage Carry-over.

AUTOMATIC ADDITION

To *add,* enter the amount to be added in the Keyboard, check it in the Keyboard Dials, lightly touch the Add Bar.

Example:

225
665
715
823
747
3175

Addition may be performed in any Carriage Position; however, Position 1 is usually preferred. Therefore, with the Carriage at the extreme left, Active Dial Indicator (Orange Arrow) pointing to Upper Dial *1,* enter 225 in the right of the Keyboard. Notice, this amount is instantly visible in a straight line in the Keyboard Dials, thus permitting a check, and a change if necessary, before the entry affects the total.

A touch of the Add Bar adds this figure into the Middle Dials, and automatically clears it from the Keyboard Dials. Notice that no matter how long you hold down the Add Bar, Marchant adds the amount only *once.* The "1" which appears in the Upper Dials indicates that one item has been added.

Repeat the process until all five items have been added. The total, 3175, appears in the Middle Dials, and the number of items added, 5, in the Upper Dials.

DIRECT SUBTRACTION

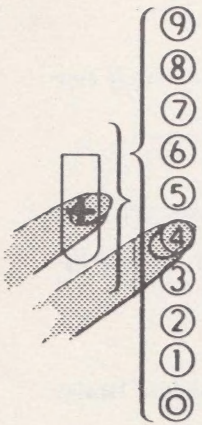
Example:

3175
– 655
2520

With Carriage in Position 1, enter 3175 in Keyboard Dials; touch Add Bar.

Enter 655 in Keyboard Dials; touch SUBTRACT Bar.

AUTOMATIC REPEAT ADDITION



Whenever the same amount is to be added more than once, just simultaneously touch the Add Bar and the Multiplier Key indexed for the number of repeats; Marchant automatically counts, repeats the addition, and clears the Keyboard Dials:

Example:

3503
6890
2356
2356
2356
2356
1653
1022
22492

Add 3503; add 6890.

Enter 2356 in Keyboard Dials and simultaneously touch the Add Bar and "4" Multiplier Key. 2356 is automatically added four times, and cleared from the Keyboard Dials. Upper Dials show the correct item count—6.

Add 1653; add 1022.

The Total, 22492, appears in the Middle Dials, and the number of items added, 8, in the Upper Dials.

AUTOMATIC REPEAT SUBTRACTION

Whenever the same amount is to be subtracted more than once, simultaneously touch the Subtract Bar and the Multiplier Key indexed for the number of repeats.

CREDIT BALANCE

. . . finding the true value of a negative number.

A Middle Dials total preceded by a *string of nines* indicates that more has been *subtracted* than added—the Middle Dials figures are the "complement" of the answer to be recorded.

> The *Complement* of a number is the difference between that number and the next higher power of 10. For example, the complement of 12 is 88 (100−12=88); complement of 144 is 856 (1000−144=856).

Example:

82
−97
24
−33
−24

Add and subtract the numbers as indicated.
Upon completion, the Middle Dials show 9999976

To change this negative total to a "true" figure amount, copy the figures (76) from the Middle Dials into the Keyboard Dials directly below their location in the Middle Dials *preceding* them with a few (two or more) of the nines—touch the NEG × Key and Multiplier Key "2".

Read Right Answer (24) at right of Middle Dials (*disregarding* the preceding . . . 99800). Either precede the copied answer with a minus sign, or write "CR" to the right of it.

ADDING TO A CONSTANT

Problems dealing with weights are a common form of addition in which constants are used.

Example: Find the gross weight:

NET WEIGHT	TARE *	GROSS WEIGHT
45	15	60
38	15	53
42	15	57

* *Weight of container or vehicle.*

Operation: With the Non Shift down, add the constant 15 in the Middle Dials.

Enter 45 in the Keyboard Dials and touch Multiplier Key "1". Copy the answer (60) from the Middle Dials. Touch the Subtract Bar and the constant will reappear in the Middle Dials and the Keyboard and Keyboard Dials will automatically clear, ready for the next operation.

Repeat, as above, for the next two items, 38 and 42.

AUTOMATIC SIMULTANEOUS "PUSH-BUTTON" MULTIPLICATION

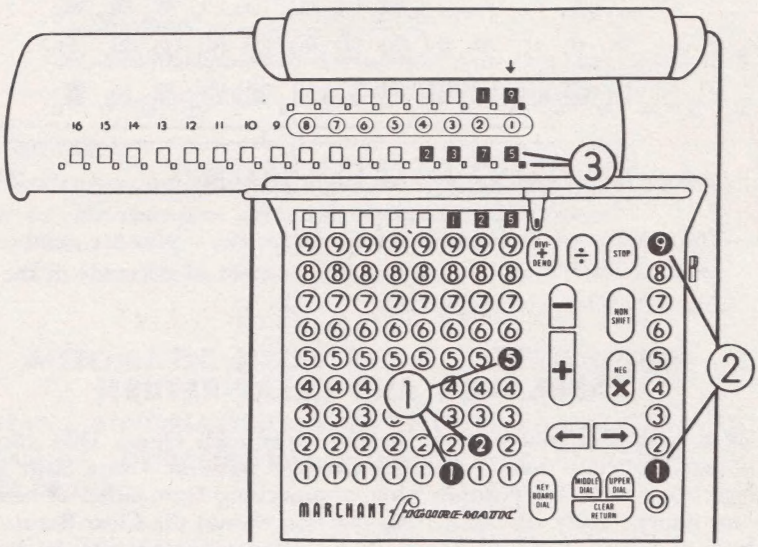
The word "simultaneous" emphasizes the outstanding difference between Marchant's exclusive "Live-Key" Multiplication and the delayed action multiplication offered by others. "Simultaneous" multiplication means that Marchant actually multiplies *while the operator is entering the multiplier figures!* It is the simplest and fastest mechanical multiplication known.

EXAMPLE: $125 \times 19 = 2375$

(1) Enter the first amount (Multiplicand, 125) in the Keyboard Dials.

(2) Now enter the second amount as you read it (Multiplier, 19) in the Automatic Multiplier Keyboard.

Instantly, as you entered the last figure (9) of the Multiplier, the Right Answer (2375) appeared in the Middle Dials! (3)



NOTICE . . . Marchant's THREE-DIAL PROOF!

Multiplicand (125) appears in the Keyboard Dials.

Multiplier (19) appears in the Upper Dials.

Right Answer (2375) appears in the Middle Dials.

To *CLEAR all* dials and automatically reposition Carriage . . . with *ONE STROKE* touch: KEY BOARD DIAL CLEAR RETURN

Note: The CLEAR-RETURN Master Key may be adjusted to give the desired Carriage dial-clearance best suited to the figurework application.

(See page 8 for setting decimals and tabulator.)

WHITE PRE-SET DECIMALS

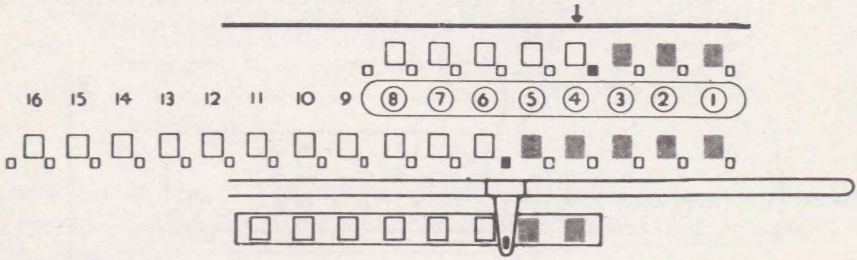
"Pre-set" means to set the decimal places needed for a group of problems *before* working any of them.

Working "around" a decimal point means to enter the whole numbers to the left of the pre-set decimal point, and the decimals to the right of that point.

THE FOLLOWING *RULE* FOR DECIMAL POINTS APPLIES TO ALL OPERATIONS:

Determine the number of decimals needed in the Keyboard Dials and the Upper Dials and set the decimals accordingly.

With the Active Dial Indicator (Orange Arrow) pointing to the first dial *left* of the Upper Dials decimal, flip over the Middle Dials decimal which is directly above the Keyboard Dials Decimal.



or—The number of decimals in the Keyboard Dials *plus* the number of decimals in the Upper Dials *equals* the number of decimals in the Middle Dials (KBD2 + UD3 = MD5)

TABULATOR AND CLEAR-RETURN

The push button tabulator keys directly under each Upper Dial afford easy and positive Carriage control for any Carriage position. Using Shift Key, the Carriage stops at set tab position when approaching from either direction, and does not unexpectedly tab out of that position should the Clear-Return Master Key be inadvertently touched. Several Tab Keys may be set at once by depressing them simultaneously.

A single touch of the CLEAR-RETURN Master Key clears Carriage dials and returns Carriage to pre-selected position.

For practice try this: Set Tab Keys *4* and *6*. With Carriage in Position 1, touch *Clear-Return* Key and notice that Carriage positively stops in Position 4. (Touch *Clear-Return* Key again and note that Carriage does not move, because it is already in a tab-set position.) Now hold down ⟹ Shift Key and note that Carriage positively stops in Position 6, which is the next tabulator setup. Now hold down ⟸ Shift Key and note that Carriage shifts in opposite direction but positively stops at the next tabulator setup, which is 4.

Note: The CLEAR-RETURN Master Key may be adjusted to give the desired Carriage dial-clearance best suited to the figurework application.

TO CHANGE A MULTIPLIER ALREADY ENTERED

Marchant's great flexibility makes it extremely easy to change any digit entered in the Automatic Multiplier Keyboard—either during multiplication or even after the multiplication has been completed.

Here's how to do it:

Just position the Active Dial Indicator over the figure in the Upper Dial you wish to change, then:

If you wish to *increase* the figure, just touch the Automatic Multiplier Key indexed for the increase desired.

For example, to increase a 5 in the Upper Dial to 8, just touch Multiplier Key "3."

If you wish to *decrease* the figure, just touch the NEG × and the Automatic Multiplier Key indexed for the decrease desired.

For example, to decrease a 7 in the Upper Dial to 3, just touch the NEG × Key and Multiplier Key "4."

That's all . . .

Marchant automatically changes the Upper Dials to the correct reading and at the same time automatically corrects the answer!

AUTOMATIC NEGATIVE MULTIPLICATION

MARCHANT AUTOMATICALLY MULTIPLIES AND SUBTRACTS THE PRODUCT AT THE SAME TIME, SHOWING THE DIFFERENCE IN THE MIDDLE DIALS.

Example: (15.73 × .74) minus (4.52 × .33) = *10.1486*

Multiply 15.73 × .74 (Middle Dials show 11.6402—do *not* clear.)
Clear Keyboard and Upper Dials only.
Enter 4.52 in Keyboard Dials around decimal point.
Negatively multiply by .33 around Upper Dials decimal point.
Middle Dials show answer, 10.1486.

Upper Dials show multiplier in complementary figures (.67 preceded by 9's). To show multiplier in *true* figures, move Upper Dials Control toward you before negatively multiplying.

See next page for other examples.

SIMPLE DISCOUNTS

Negative Multiplication is frequently used in discount problems.

Example: Total of an invoice is $535.50 from which a 15% *discount* is deducted. Find the "net" amount (amount remaining *after* the discount is deducted).

The example problem above is actually:
$535.50 minus ($535.50 × 15%) = $455.18, Net Amount.

Set the Keyboard Dials Decimal at 2, Upper Dials at 2, Middle Dials 4.
Set Tab Key 3. Begin with Carriage in Position 3.
Enter 535.50 in the Keyboard Dials and multiply by 1., which equals 100% of 535.50 (both the Keyboard and Middle Dials now show the figures 535.50).

Hold down NEG × Key and enter .15 in Multiplier Keyboard.

Middle Dials show the *net amount*, 455.175
Upper Dials show the net percentage, .85

The same result will be obtained by the direct method—multiplying 535.50 × .85 (100% − 15%).

CHAIN DISCOUNTS

Chain Discount is a form of trade discount consisting of a series of per cents deducted from a gross amount. (The same procedure used to deduct a single discount applies to deducting a *chain* of discounts.) Work *around pre-set decimals*, the same as you do for accumulative multiplication.

Example: $392.00 less 15, 10, 5% = $284.89 (The problem is actually: 392.00 minus 15% = 333.20 minus 10% = 299.88 minus 5% = 284.886.)

Pre-set the decimals to accommodate *any* discount problem which may occur.

For example, a setup of Keyboard Dials 2; Upper Dials 4; Middle Dials 6 with Tab Keys 4 and 5 down should accommodate any discount which might occur.

a. With Carriage in Position 5, enter the Gross Amount (392.00) in the Keyboard Dials and multiply by "1.". Hold down NEG × Key and enter .15 in Multiplier Keyboard.

b. Middle Dials show 333.20.
Clear Keyboard and Upper Dials only.
Copy Middle Dials amount into the Keyboard Dials.
With Carriage in Position 4, negatively multiply by next discount (.10).

c. Middle Dials show 299.88.
Clear Keyboard and Upper Dials only.
Copy Middle Dials amount into Keyboard Dials.
Negatively multiply by next discount (.05). Always enter Keyboard and Upper Dials amounts *around* the pre-set decimals.

Net *amount* (284.886) appears in Middle Dials.

CHAIN DISCOUNT TABLES

Usually chain discount work can be simplified by *direct multiplication,* using a special table prepared by Marchant Calculators, Inc., and supplied on request. Marchant Tables 14 and 14A show decimal equivalents for commonly used chain discounts and their complements. Multiplying any amount by the decimal equivalent of the chain discount gives the amount of the discount. Multiplying the amount by the decimal equivalent of the complement of the discount gives the net amount after deduction of the discount.

Example: Find discount and net amount of
$465.75 less discount of 12½, 5, 2½%.

Set Decimals: Keyboard Dials at 5; Upper Dials 2 and Middle Dials 7.
Set Tab Key 5. Carriage in position 5.

Operation: Enter .18953 (decimal equivalent of discount obtained from table) in Keyboard Dials. Multiply by 4-6-5-7-5 around the Upper Dials decimal. The *discount,* $88.27, appears in the Middle Dials. *or,*

To obtain the net amount, CLEAR-RETURN *all* dials and enter .81047 (complement of decimal equivalent obtained from table) in the Keyboard Dials. Multiply by 4-6-5-7-5. The *net amount,* $377.48, appears in the Middle Dials.

DOUBLE MULTIPLICATION

Two amounts may be multiplied by the same multiplier in one operation. In entering invoices of incoming merchandise, many stores show both cost and selling price on the invoice and require both columns to be extended.

Example: QUANTITY	SELLING PRICE	AMOUNT	COST PRICE	AMOUNT
96	.55	52.80	.33	31.68
58	.67	38.86	.45	26.10

Set Decimals:

Keyboard Dials 8 and 2, Upper Dials 2, Middle Dials 10 and 4. Set Tab Key "4".

Enter in Keyboard Dials "Selling Price" (.55) around 8th decimal and "Cost Price" (.33) around 2nd decimal.

Multiply by "Quantity" (96.) around Upper Dials decimal.

Middle Dials show total Selling Price (52.80) at the left; and Cost (31.68) at the right. CLEAR-RETURN all dials.

This application may be easily modified to accommodate discounts, transportation, and proportionate surcharges. (The 10-column Marchant has greater capacity for this application than has the 8-column.)

SUGGESTIONS FOR OPERATING TECHNIQUE

Operate the Marchant with your LEFT hand.

Having the Marchant at your left permits easier reading from work sheet to calculator. Also, left-handed operation is less tiring because you are not using one hand for everything. You may find that the operating time between left and right hands is close, but a marked difference appears when the time spent in copying the answers is considered in the complete operation.

Use your right hand to follow the work.

Have the Marchant at your left – in a position which is comfortable to YOU. You should be able to read the dials and the work sheet easily. When you clear the dials, your left hand should be in a natural position – not turned, or in a stiff position.

Hold a pencil in the right hand.

Complete clearance is made with one stroke by using the index, middle, and ring fingers to clear: Simultaneously touch the Keyboard Dials, Middle Dials, and Upper Dials Clear Keys and CLEAR-RETURN . . . all three dials clear and the Carriage glides into position.

PLACEMENT OF WORK: Place your work sheets in front of you, in a writing position, and in line so that your eyes travel easily from calculator to paper.

USE THE KEYBOARD DIALS: Immediately before touching a control key, glance at the Keyboard Dials to be sure your entry is correct.

An operator should become accustomed to reading figures in a straight line . . . then entering them in the calculator as they appeared on the work sheet . . . and then see them in a straight line in the Keyboard Dials.

MULTIPLYING WITH A CONSTANT MULTIPLICAND

Constants are used for successive multiplications in many business calculations. The constant is set in the Keyboard Dials and the variable second amounts in the Automatic Multiplier, reading answers from the Middle Dials and touching only the CLEAR-RETURN upon completion of each problem. *Example:*

S. J. COMPANY — Payroll, Week Ending June 20

NAME	Clock No.	Rate Per Hour	Hours	AMOUNT
R. Johnson	415	1.4225	39	√√.48
C. Swenson	416	1.4225	40	√6.90
B. Curley	417	1.4225	35	49.79
A. McArthur	418	1.4225	38	√4.06

AUTOMATIC DIVISION

Marchant's Automatic Division performs all division problems automatically and electrically at the touch of a key, giving instant results with unequalled simplicity and ease.

Example: DIVIDEND ÷ DIVISOR = QUOTIENT
128.34 ÷ 31.65 = 4.055

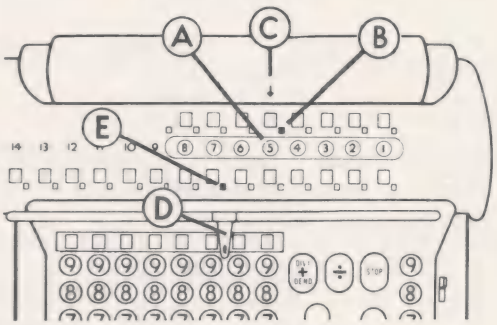
Detailed Instructions for a group of division problems:

Ⓐ To carry an answer out to *four* decimal places, set Tab Key 5. (Always carry the answer out to *one more* than the number of decimals you need to record, to allow for adjusting the last figure in the answer.)

Ⓑ Set Upper Dial Decimal to the right of the Tab Key (between 5 and 4).

Ⓒ Shift the Carriage into Position 5.

Ⓓ Now position the Keyboard Dial Decimal Pointer so you can enter both amounts (Dividend and Divisor) "around" it.



Ⓔ Flip over the Middle Dial decimal directly above the Keyboard Dials decimal.

To *divide*, enter the Dividend (128.34) in the Keyboard Dials "around" the decimal point. Touch the Add Bar (or Dividend Key) to transfer the Dividend into the Middle Dials.

Enter the Divisor (31.65) in the Keyboard Dials "around" the decimal point. Touch the Division Key. (Any figures in the Upper Dials automatically clear as the Division Key is touched.)

Answer (4.0549) automatically appears in Upper Dials.

DIVIDEND + KEY:

Upon completion of a division problem, the Keyboard Dials are automatically cleared, ready for entry of the next dividend.

A touch of the DIVIDEND + Key automatically clears the Carriage dials, repositions the Carriage, transfers the dividend from the Keyboard Dials into the Middle Dials, and clears the Keyboard Dials, ready for entry of the divisor.

DIVISION LINE-UP:

When the Dividend (Middle Dial factor) extends to the left of the Divisor (Keyboard Dial factor), hold down ⟹ Key until the left-hand figure in Middle Dial is in line with left-hand figure in Keyboard Dial before touching Division Key.

(See page 17 for explanation of "spread" decimal setup in division, eliminating use of the Shift Key for Carriage line up.)

DIVISION STOP: The division process may be completely stopped at any time by touching the "STOP" Key twice.

PERCENT OF INCREASE AND DECREASE

This type of calculation is used wherever comparative figures are necessary to guide the future direction and policies of a business. For example, analyzing statements and comparing the current period to some previous period or periods is a great help to the management of a business. The clearest way to see Increase or Decrease is when it is expressed as a percentage.

EXAMPLES:	Current Period	Previous Period	Amount	Per cent
Increase	$1,495.76	$1,421.25	$74.51	+ 5.2%
Decrease	$1,456.27	$1,512.42	$56.15	− 3.7%

$$\text{INCREASE \%} = \frac{+\ \text{CURRENT} - \text{PREVIOUS}}{\text{PREVIOUS}} \qquad \text{DECREASE \%} = \frac{-\ \text{CURRENT} + \text{PREVIOUS}}{\text{PREVIOUS}}$$

GENERAL OUTLINE:

Setup: Decimals – Keyboard Dials at 2; Upper Dials 2; Middle Dials 6.
Tab Key No. 5

① Enter *current period* in Keyboard Dials:
(Carriage in position 5.)
If *increase:* touch "DIVIDEND +" Key.
If *decrease:* touch *NEG* X and then "DIVIDEND +" Key.

② Enter *previous period* in Keyboard Dials:
If *increase:* touch *NEG* X *Key* and *Multiplier Key No. "1."*
If *decrease:* touch *Multiplier Key No. "1" only.*

Amount of increase or decrease appears in Middle Dials. (Copy to worksheet, if desired. (Note that Divisor remains in Keyboard Dial.)

③ Touch *Division Key* and answer appears in Upper Dials correctly pointed off as a *per cent.*

OPERATIONS:

FOR INCREASE: Enter current $1,495.76 in Keyboard Dials; touch "DIVIDEND +" Key.
Enter previous $1,421.25 in Keyboard Dials; negatively multiply by "1".
Increase, $74.51, appears in Middle Dials; touch Division Key.
Per cent of increase, 5.2%, appears in Upper Dials.

FOR DECREASE: Enter current $1,456.27 in Keyboard Dials; touch NEG × and "DIVIDEND +" Keys.
Enter previous $1,512.42 in Keyboard Dials; multiply by "1".
Decrease, $56.15, appears in Middle Dials; touch Division Key.
Per cent of decrease, 3.7%, appears in Upper Dials.

RECIPROCAL-PERCENTAGE METHOD

An example of proration and distribution common to all business is to find the percentage proportion which each department bears to total sales and to distribute the total expense according to those percentages.

When several items are to be divided by the same divisor, the reciprocal of the divisor may be used as a constant multiplicand. Multiplying this reciprocal by the item gives the same result as direct division. (The reciprocal of any number is found by dividing the unit 1 by that number.)

Formula:

$$\frac{1}{\text{Total}} \times \text{Each Amount} = \% \text{ to Total}$$

Calculate as:

$$\frac{1}{\$1728} = 05787037 \times \$126 = 7.29\%, \text{ etc.}$$

DEPT.	EXPENSE	Per cent to Total
A	$126	7.29%
B	95	5.50
C	214	12.38
D	252	14.58
E	110	6.37
F	341	19.73
G	212	12.27
H	198	11.46
J	180	10.42
	$1728	100.00%

OPERATION:

(1) With Carriage to extreme right, Position 8 (or 10), enter "1" in extreme left of Keyboard Dials, and touch "DIVIDEND +" Key. Enter Total (Expense,1728) in extreme left of Keyboard Dials and touch *Division Key.* Copy *Reciprocal* which appears in Upper Dials (05787037) into Keyboard Dials.

(2) Touch CLEAR-RETURN to clear Carriage Dials and then multiply by Total (1728) as positive proof of correct Keyboard Dials entry and also to determine decimal setting as follows:

Place Upper and Middle Dials decimals in correct relation to figures in dials: Upper Dials 1728.0000 and Middle Dials 99.999999 (between *2nd* and *3rd* 9's) to show as a *per cent* the answers to be copied; and set Tab Key according to multipliers (example, Tab Key 7).

Some operators prefer to increase the right-hand figure of the reciprocal by "1". After multiplying, the Middle Dials will then show 1000000 . . . thus the Middle Dials decimal is placed to show 100.0000

(3) A single stroke  clears Carriage Dials and automatically returns Carriage.

Now enter each amount (of Expense) in Multiplier Keyboard around Upper Dial decimal. Answer appears in Middle Dials, correctly pointed off as a per cent. Copy answer to worksheet and touch CLEAR-RETURN after each multiplication.

(4) Upon completion of all multiplications, clear Keyboard Dials. Add all percentages to prove that each answer was correctly copied to worksheet. These should total exactly 100.00%. *NOTE: If Total does not equal exactly 100.00%, the usual practice is to adjust the largest amount, etc.*

PRORATING —— CONSTANT METHOD

True prorating is the distribution by amount instead of by per cent. When the per cent is not required, this method of prorating shortens the process considerably.

EXAMPLE:

DEPT.	SALES	Dept. Expense
A	$ 3245	$1020.02
B	3015	947.72
C	5965	1875.01
D	4236	1331.52
E	822	258.38
	$17283	$5432.65

Formula: $\frac{\text{Amount to be Prorated}}{\text{Base Total}} \times \text{Each Amount} = \text{Amount Per Unit of Base}$

Calculate as: $\frac{\$5432.65}{\$17283.} = .31433489 \times \$3245. = \$1020.02$, etc.

OPERATION:

(1) With Carriage to extreme right Position 8 (or 10) enter amount to be prorated (Total Department Expense, 5432.65) in extreme left of Keyboard Dials, and touch "DIVIDEND +" Key.

Enter Base Total (Total Sales, 17283) in extreme left of Keyboard Dials, and touch *Division Key.*

Copy Upper Dials figures (Expense per Sales Dollar, 31433489. .) into Keyboard Dials.

(2) Touch CLEAR-RETURN to clear Carriage Dials and then multiply by Total (Sales, 17283) as positive proof of correct Keyboard Dials entry and also to determine decimal setting:

Place Upper Dials and Middle Dials decimals in correct relation to figures in dials: Upper Dials: 17283.000; Middle Dials: 5432.649

Set Tab Key according to multipliers.

(3) A single stroke  clears Carriage Dials and automatically returns Carriage.

Enter amount of Sales for each Department in Multiplier Keyboard. Answer appears in Middle Dials, correctly pointed off. Copy answer to worksheet and touch CLEAR-RETURN after each multiplication.

(4) Upon completion of all multiplications, clear Keyboard Dials. Add all amounts to prove that each answer was correctly copied to worksheet. These should total exactly $5432.65.

NOTE: If Total does not equal exactly $5432.65, the usual practice is to adjust the largest amount, etc.

SPREAD DECIMAL SETUP IN DIVISION

A "spread" decimal setup can be used to *eliminate line-up* when there are many division problems to be calculated which would require line-up.

For Example: 8372.71 ÷ 8.55 = 979.26

Assume Carriage is in Position 6 and Upper Dial Quotient Decimal therefore would be at 5.

Enter Dividend in Keyboard Dial around 2nd decimal as: 0 0 0 0 8 | 3 7 2 . 7 1
and *add* it into Middle Dial with a touch of "DIVIDEND +" ←3→

Enter Divisor in Keyboard Dial around 5th decimal as: 0 0 0 0 8 . 5 5 0 0 0

Note that the decimals now read as Middle Dial 7 and Keyboard Dial 5, thus the Upper Dial Quotient Decimal is *actually at 2* ... or in other words ...

If you enter the Dividend around the **2nd** Keyboard Dial Decimal and the Divisor around the **5th** Keyboard Dial Decimal, then the Upper Dial Quotient Decimal will be moved **3** places to the right. (Touch Division Key. Upper Dial shows 979.26)

Example of Rule: Upper Dial 0 0 0 0 0 . 0 0 0 0 0

Keyboard Dial 0 0 0 0 0 0 0 0 . 0 0

FINDING PERCENTAGE

Example: What per cent of $834.00 is $191.82?

Operation: Simply divide $191.82 by $834.00 and the result, 23%, appears in the Upper Dials. Regardless of how this type of problem is expressed, the *"of"* amount is always the divisor.

PER CENT MARK-ON

In retail accounting the percentage of profit on an item (Per cent Mark-on) is usually figured on the selling price.

Example: Cost price $12, Selling price $15, Profit $3

Per cent Mark-on: 3 ÷ 15 = 20%

Decimal setup: Keyboard Dials 2, Upper Dials 2 (for %), Middle Dials 6. Set Tab Key No. 5.

Operation: With Carriage in 5th position, subtract the cost price (12). Add the selling price (15) by multiplying by 1. Profit of $3 shows in the Middle Dials. Touch Division Key and per cent mark-on (20%) appears in the Upper Dials. (Same operation as Increase-Decrease problem, detailed on page 14)

SELLING PRICE

Example: Cost $6, Mark-on 25%. What is selling price?

Operation: Add 6, divide by .75 (100% less 25% mark-on desired). Upper Dials show selling price ($8).

SUBTRACTING FROM A CONSTANT

Example:

125.50 – 26.40 = 99.10
125.50 – 87.50 = 38.00
125.50 – 50.40 = 75.10

With the Non Shift control down, add the constant 125.50 into the Middle Dials. Enter 26.40 in the Keyboard Dials and subtract by touching the NEG × Key and Multiplier Key No."1." The remainder 99.10 appears in the Middle Dials. Touch the Add Bar to restore the constant.

SUBTRACTING A CONSTANT

Example:

Find the net weight, using the problem on page 6. Enter the constant *15* in the Keyboard and touch the Subtract Bar, producing the *complement* of the constant in the Middle Dials. Enter the amount from which the constant is to be subtracted (60) in the Keyboard Dials and touch the Multiplier Key "1". The difference (45) is in the Middle Dials. Touch the Subtract Bar to restore the constant in its complementary form in the Middle Dials.

INTEREST

A simple and universal formula easily used on the Marchant is:

$$\frac{\text{Principal} \times \text{Rate} \times \text{Days}}{360 \text{ (or } 365)}$$

Example:

Find the interest on $3,549.00 at 5% for 41 days (360 day basis).

Decimal setup: Keyboard Dials 2, Upper Dials 3, Middle Dials 5.

Operation: Multiply 3,549.00 by .05 and the result by 41. Then divide by 360. The interest, $20.21, appears in the Upper Dials.

Marchant Table 5 further simplifies this by showing 360 or 365 divided by "rate" as one factor, thus reducing the problem to multiplying:

$$\frac{\text{Principal} \times \text{Days}}{\text{Table Factor}}$$

This kind of problem illustrates the versatility of the Marchant in alternating multiplication and division problems without "conditioning" the calculator for each type of problem and without the necessity of clearing intermediate figures. The division is done directly following the multiplication.

UNIT LANDED COST

JOHN SMITH SHOE CO.		*Unit Landed Cost*
Unit List		
9 pairs Shoes @ 4.50 Pair	40.50	4.11
6 pairs Shoes @ 5.25 Pair	31.50	4.79
8 pairs Shoes @ 3.95 Pair	31.60	3.60
7 pairs Shoes @ 4.65 Pair	32.55	4.24
	136.15 (List)	
Less 15% Discount	20.42	
Freight and Drayage	8.50	
	124.23 (Net)	

FORMULA: $\frac{\text{NET}}{\text{LIST}}$ X UNIT LIST = UNIT COST

(Model ADX – with Middle Dial Clearance disconnected from Clear-Return Key)

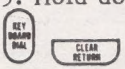
Decimal setup: Keyboard Dial 5 – Upper Dial 5 – Middle Dial 10. Tab Key 6.

Accumulate the extensions:

Carriage in Position 6. Enter 4.50 in Keyboard Dial and 9 in Multiplier Keyboard. After each multiplication, touch 

Upon completion of individual extensions, Middle Dial shows accumulated total (136.15).

Deduct discount:

Copy 136.15 into Keyboard Dial. Carriage in Position 5. Hold down **NEG X** Key while entering .15 in Multiplier Keyboard. Clear 

Add Freight and Drayage:

Carriage in Position 6. Enter 8.50 in Keyboard Dial and touch Add Bar.

Net Amount appears in Middle Dial (124.23).

Now enter total of 136.15 in Keyboard Dial and touch DIVISION Key.

Upper Dial shows *constant factor* of .91243

Copy amount (.9124) into Keyboard Dial. Touch 

Figure Unit Landed Cost of each invoice item:

Multiply by each Unit List Price...

Enter 4.50 in Multiplier Keyboard, and Unit Landed Cost appears in Middle Dial (4.11).

After each multiplication, touch 

This is an example of a "Marchant-Method" ––– ask your Marchant representative about special applications pertaining to your particular figurework.

Decimal Equivalents of Common Fractions

Fractions are always expressed as decimals on a calculator.

A table of decimal equivalents of commonly used fractions is shown below.

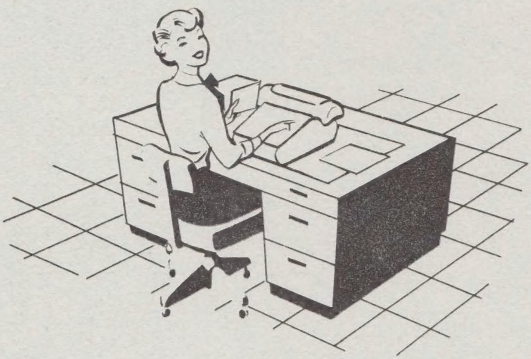
In the absence of such tables the decimal equivalent of any fraction is found by dividing the numerator by the denominator. *Example:* 5 / 64 = .078125

Decimal Equivalents of Common Fractions

3rds	4ths	6ths	8ths	12ths	16ths	32nds	Dec. Eq.
						1/32	.03125
					1/16	2/32	.0625
				1/12			.08333
						3/32	.09375
			1/8		2/16	4/32	.125
						5/32	.15625
		1/6		2/12			.16667
					3/16	6/32	.1875
						7/32	.21875
	1/4		2/8	3/12	4/16	8/32	.25
						9/32	.28125
					5/16	10/32	.3125
1/3		2/6		4/12			.33333
						11/32	.34375
			3/8		6/16	12/32	.375
						13/32	.40625
				5/12			.41667
					7/16	14/32	.4375
						15/32	.46875
	2/4	3/6	4/8	6/12	8/16	16/32	.5
						17/32	.53125
					9/16	18/32	.5625
				7/12			.58333
						19/32	.59375
			5/8		10/16	20/32	.625
						21/32	.65625
2/3		4/6		8/12			.66667
					11/16	22/32	.6875
						23/32	.71875
	3/4		6/8	9/12	12/16	24/32	.75
						25/32	.78125
					13/16	26/32	.8125
		5/6		10/12			.83333
						27/32	.84375
			7/8		14/16	28/32	.875
						29/32	.90625
				11/12			.91667
					15/16	30/32	.9375
						31/32	.96875

64ths	
1	.015625
2	.031250
3	.046875
4	.062500
5	.078125
6	.093750
7	.109375
8	.125000
9	.140625
10	.156250
11	.171875
12	.187500
13	.203125
14	.218750
15	.234375
16	.250000
17	.265625
18	.281250
19	.296875
20	.312500
21	.328125
22	.343750
23	.359375
24	.375000
25	.390625
26	.406250
27	.421875
28	.437500
29	.453125
30	.468750
31	.484375
32	.500000
33	.515625
34	.531250
35	.546875
36	.562500
37	.578125
38	.593750
39	.609375
40	.625000
41	.640625
42	.656250
43	.671875
44	.687500
45	.703125
46	.718750
47	.734375
48	.750000
49	.765625
50	.781250
51	.796875
52	.812500
53	.828125
54	.843750
55	.859375
56	.875000
57	.890625
58	.906250
59	.921875
60	.937500
61	.953125
62	.968750
63	.984375

SPECIAL MARCHANT METHODS



Marchant will gladly furnish Methods, Tables, etc. for any business or industry and have a skilled Instructor call free of all charges.

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The Marchant Tradition

With the purchase of a Marchant calculator you share in the *Marchant Tradition* of 45 years standing – the tradition of giving the ultimate in product value and figurework service. This tradition is valuable to you because . . . .

THE FINEST OBTAINABLE *research, engineering, materials, production techniques, and human abilities are the basic ingredients of your Marchant calculator.*

OUR SALES REPRESENTATIVES' *statements are responsible presentations based on established acts and are backed by this Company.*

OUR INSTRUCTORS *are anxious to make certain that your operators clearly understand each Marchant feature and operation, in order to assure you of the* full *savings made possible by your purchase of a Marchant.*

OUR TECHNICAL SERVICES *include the preparation of special, detailed applications of your Marchant to your figurework. These applications, called "Marchant Methods," are made available to you free of charge.*

OUR MECHANICAL SERVICE *Representatives have a sincere interest in the important role your Marchant plays in contributing to efficient and profitable operation of your business. They are thoroughly trained and fully qualified to assure you of long and faithful service from your Marchant calculator.*

Marchant will continue to pioneer progress in electric calculation and its resultant benefits to business, industry and science – to the end that in buying a Marchant you will do so with complete assurance of having the use of the most advanced product in the art of calculator design.

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MARCHANT CALCULATORS, INC.

Oakland 8, California

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